



Statement of Basis

Air Quality Construction Permit

Lectrus - Tea, South Dakota

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1.0 BACKGROUND

DTS Incorporated (DTS) in Tea, South Dakota, received an air quality permit on August 21, 2009. An administrative amendment to change the name of the facility from DTS Inc. to Lectrus was approved on September 7, 2010. An application to construct a second paint booth and add an air handling unit was received on January 5, 2011 and determined complete on January 13, 2011.

The facility manufactures steel cage enclosures and fuel tanks for industrial sized back-up generators. Metal components are fabricated through various procedures including cutting, drilling, sanding, welding and coating of the finished products. The facility also completes the assembly of the finished product, which includes accessory installation and mounting of the prefabricated motors.

Raw materials are brought to the machining area to be cut, bent, or rolled into the desired shape. These parts are designated for the construction of either the generator tank or the generator enclosure/housing. Once completed, the parts are assembled and/or welded to complete the generator tanks and enclosures. Any emissions from these processes are contained within the building.

After the parts have been assembled, the structures are cleaned by hand with a wax and grease remover, and then primed and painted in the spray booth. The structures are then air dried within the building. Based on the final product and the activities described the primary Standard Industrial Classification (SIC) code is 3448 – Prefabricated Metal Buildings and Components.

Table 1-1 provides a list of the currently permitted units.

Table 1-1 – Description of Currently Permitted Units

Unit	Description	Maximum Operating Rate	Control Device
#1	EU01 1998 Hurst boiler Model # 545-G-126.3-30W. Fired with natural gas.	5.3 MMBtu/hr.	Not applicable
#2	EU02 1998 Hurst boiler Model # 545-G-126.3-30W. Fired with natural gas.	5.3 MMBtu/hr.	Not applicable
#3	EU03 2007 Caterpillar C15 diesel fuel fired generator	500 Kilowatts	Not applicable
#4	EU04 1998 Kappers Fab Inc. spray booth. The paint booth uses both gravity and HVLP spray guns.	Not applicable	Dry filter pads.

A 2007 850 gallon aboveground storage tank used for the storage of diesel fuel was determined to be an insignificant activity.

Lectrus submitted a request to construct a second paint booth and to install a 90,000 cubic foot per minute direct fired natural gas air replacement unit. Table 1-2 provides a description of the units being reviewed.

Table 1-2 – Description of New Units

Unit	Description	Maximum Operating Rate	Control Device
#5	2010 AEI Paint Booth Model ATC-322680. The paint booth uses airless electrostatic spray guns	Not Applicable	Not Applicable
#6	2010 AEI Air Replacement Unit fired with natural gas	12.15 million Btus per hour	Not applicable

2.0 POTENTIAL EMISSIONS CALCULATIONS

2.1 Emission Factors

DENR uses stack test results to determine air emissions whenever stack test data is available from the source or a similar source. When stack test results are not available, DENR relies on manufacturing data, material balance, EPA's Compilation of Air Pollutant Emission Factors (AP-42, Fifth Edition, Volume 1) document, the applicant's application, or other methods to determine potential air emissions.

In this case, DENR used EPA's AP-42 1.4-1, Natural Gas Combustion, for emission factors for the air replacement unit. DENR will consider the air replacement unit to have emissions similar to a small industrial boiler. Small industrial boilers have a gross heat rate up to 100 million Btus per hour. The emission factors for small industrial boilers are listed in Table 2-1.

Table 2-1 – Uncontrolled Emission Factors for Air Replacement Unit

Pollutant	TSP/PM10/PM2.5¹	SO₂	NO_x	CO	VOCs	HAPs
Natural Gas (lbs/MMscf)	7.6	0.6	100	84	5.5	1.89

¹ – It is noted in AP-42 that particulate emissions from burning natural gas are all less than one micron in diameter. Therefore, the emission factor for particulate matter less than or equal to 10 microns in diameter (PM10) and particulate matter less than or equal to 2.5 microns in diameter (PM2.5) is the same as the emission factor for total suspended particulate (TSP); and

2.2 Potential Emissions

Potential emissions for each applicable pollutant are calculated from the maximum design capacity listed in the application and assuming the unit operates every hour of every day of the year, while using the fuel that will emit the greatest emissions. Potential emissions are not realistic of the actual emissions and are used only to identify which air quality permit and requirements Lectrus is required to meet.

2.2.1 Potential Emissions – Air Replacement Unit

Equation 2-1 is used to calculate the potential quantity of natural gas, in cubic feet per year, being used based on the capacity of the unit and a heat input of 1,020 Btus per cubic foot for natural gas.

Equation 2-1 – Potential fuel use

$$\text{Fuel Usage} = \text{Maximum Capacity} \frac{\text{Btus}}{\text{hour}} \div \text{heat content} \frac{\text{Btus}}{\text{cubic foot}} \times 8,760 \frac{\text{hours}}{\text{year}}$$

Using Equation 2-1, the potential fuel usage for the air replacement unit is:

- 12,150,000 Btus/hour / 1,020 Btu/cubic foot x 8,760 hours/year
= 104.3 million cubic feet per year

There is no control equipment associated with the unit. Therefore, the potential uncontrolled emissions are equal to the potential controlled and will be referred to as potential emissions.

Equation 2-2 is used to calculate the potential emissions for natural gas combustion based on the AP-42 emission factors in Table 2-1 and the potential fuel usage calculated previously in Equation 2-1.

Equation 2-2 – Potential emissions from natural gas combustion

$$\text{Potential Emissions} \frac{\text{pounds}}{\text{year}} = \text{Potential Fuel Usage} \frac{\text{million cubic feet}}{\text{year}} \times \text{Emission Factor} \frac{\text{pounds}}{\text{million cubic feet}}$$

$$\text{Potential Emissions} \frac{\text{tons}}{\text{year}} = \text{Potential Emissions} \frac{\text{pounds}}{\text{year}} \div 2000 \frac{\text{pounds}}{\text{ton}}$$

Using Equation 2-2, DENR calculated the potential emissions for the air replacement unit. The results are shown in Table 2-2.

Table 2-2 – Potential Uncontrolled Emissions from Air Replacement Unit (tons/year)

Pollutant	TSP/PM10/PM2.5	SO ₂	NO _x	CO	VOCs	HAPs
Unit #6	0.4	0.03	5.2	4.4	0.3	0.1

2.2.2 Potential Emissions – Spray Booth

The emission factors for the spray booths were derived from the material safety data sheets for the products used in the spray booths. The potential emission rate is estimated from the amount of paint and solvent used in the spray booths and the amount of time the booths are operated. Lectrus identified in the permit application that the spray booth operates 8 hours per day for 6 days per week, 52 weeks per year (2,496 hours per year) Potential emissions are calculated assuming that the facility operates 24 hours per day 365 days per year (8,760 hours per year). Therefore, the potential emissions for the spray booth will be calculated by multiplying the actual emissions by the ratio in Equation 2-3 (See Appendix A).

Equation 2-3 – Spray Booth Multiplying Factor

$$\frac{8,760 \text{ potential operating hours/ year}}{2,496 \text{ actual operating hours/ year}} = 3.51$$

Potential uncontrolled emissions are those that would occur with no emission controls. Dry filter media are used to control particulate matter; however, the filters do not control volatile organic compound or hazardous air pollutant emissions. Table 2-4 provides a summary of the potential emissions from the proposed spray booth.

Table 2-4 – Spray Booth Potential Emissions

Pollutant	Potential Emissions
Volatile Organic Compounds (VOCs)	57.1 tons per year
Total Hazardous Air Pollutants	21.4 tons per year

3.0 POTENTIAL EMISSIONS SUMMARY

The potential uncontrolled emissions from the proposed construction project are summarized in Table 3-1.

Table 3-1– Potential Uncontrolled Emissions from Construction Project (tons/year)

Unit	TSP/PM10/PM2.5	SO₂	NO_x	CO	VOC	HAPs
#5 Spray Booth	0.0	0.0	0.0	0.0	57.1	21.4
#6 Air Replacement Unit	0.4	0.03	5.2	4.4	0.3	0.1
Total	0.4	0.03	5.2	4.4	57.4	21.5

4.0 PERMIT REQUIREMENTS

4.1 New Source Review

ARSD 74:36:10:01 states that New Source Review (NSR) regulations apply to areas of the state which are designated as nonattainment pursuant to the Clean Air Act for any pollutant regulated under the Clean Air Act. Lectrus is located in Tea, South Dakota, which is in attainment or unclassifiable for all the pollutants regulated under the Clean Air Act. Therefore, Lectrus is not subject to NSR review.

4.2 Prevention of Significant Deterioration

Any stationary source which emits or has the potential to emit 250 tons per year or more of any air pollutant is considered a major source and is subject to prevention of significant deterioration (PSD) requirements (ARSD 74:36:09 – 40 CFR. Part 52.21(b)(1)). Any stationary source which emits or has the potential to emit 100 tons per year or more of any air pollutant and is one of the 28 named PSD source categories is subject to PSD

requirements (ARSD 74:36:09 – 40 CFR. Part 52.21(b)(1)). The following is a list of regulated pollutants under the PSD program:

1. Total suspended particulate (PM);
2. Particulate matter with a diameter less than or equal to 10 microns (PM10);
3. Particulate matter with a diameter less than or equal to 2.5 microns (PM2.5);
4. Sulfur dioxide (SO₂);
5. Nitrogen oxides (NO_x);
6. Carbon monoxide (CO);
7. Ozone – measured as volatile organic compounds (VOCs);
8. Lead;
9. Fluorides;
10. Sulfuric acid mist;
11. Hydrogen sulfide;
12. Reduced sulfur compounds; and
13. Total reduced sulfur.

Lectrus does not meet the 250 tons per year threshold and is not one of the 28 named PSD source categories. Therefore, Lectrus is considered a minor source under the PSD program and is not subject to PSD requirements.

4.3 New Source Performance Standards

DENR reviewed the new source performance standards (NSPS) and determined the proposed construction project is not applicable to any NSPS standards.

4.4 National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61)

DENR reviewed the national emission standards for hazardous standards and determined the proposed construction project is not applicable to any standards under 40 CFR Part 61.

4.5 National Emission Standards for Hazardous Air Pollutants (40 CFR Part 63)

DENR reviewed the Maximum Achievable Control Technology (MACT) standards under 40 CFR Part 63 and determined the following need to be reviewed further to determine if they are applicable.

4.5.1 ARSD 74:36:08:37 40 CFR Part 63, Subpart Mmmm

DENR reviewed the national emission standards and determined the proposed construction project may be applicable to 40 CFR Part 63, Subpart Mmmm. Subpart Mmmm is subject to owners or operators of miscellaneous metal parts and product surface coating facilities. Miscellaneous metal parts and products include, but are not limited to, metal components of the following types of products as well as the products themselves: motor vehicle parts and accessories, bicycles and sporting goods, recreational vehicles, extruded aluminum structural components, railroad cars, heavy duty trucks, medical equipment,

lawn and garden equipment, electronic equipment, magnet wire, steel drums, industrial machinery, metal pipes, and numerous other industrial, household, and consumer products.

Surface coating is the application of coating to a substrate using, for example, spray guns or dip tanks. When application of coating to a substrate occurs, then surface coating also includes associated activities, such as surface preparation, cleaning, mixing, and storage. However, these activities do not comprise surface coating if they are not directly related to the application of the coating. Coating application with handheld, non-refillable aerosol containers, touch-up markers, marking pens, or the application of paper film or plastic film which may be pre-coated with an adhesive by the manufacturer are not coating operations for the purposes of this subpart.

A facility is subject to this subpart if it uses 946 liters (250 gallons (gal)) per year, or more, of coatings that contain hazardous air pollutants (HAP) in the surface coating of miscellaneous metal parts and products as described above; and that is a major source, is located at a major source, or is part of a major source of emissions of HAP. A major source of HAP emissions is any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit any single HAP at a rate of 9.07 megagrams (Mg) (10 tons) or more per year or any combination of HAP at a rate of 22.68 Mg (25 tons) or more per year.

Currently, Lectrus does use more than 250 gallons per year of several coatings that contain HAPs. With the addition of the second spray booth, Lectrus would have potential HAP emissions of less than 10 tons per year of a single HAP and but the potential to emit greater than 25 tons per year of any combination of HAPs and would meet the definition of a major source. Lectrus has requested federally enforceable permit conditions that would restrict potential HAPs emissions to less than 25 tons per year. Lectrus will continue to meet the definition of an area source. Therefore, this subpart is not applicable to Lectrus.

4.5.2 ARSD 74:36:08: 40 CFR Part 63, Subpart HHHHHH

DENR reviewed the national emission standards and determined that the Lectrus may be applicable to 40 CFR Part 63, Subpart HHHHHH is applicable to owners or operators of paint stripping operations, miscellaneous surface coating area sources and the spray application of coatings containing compounds of chromium (Cr) lead (Pb), manganese (Mn), nickel (Ni), or cadmium (Cd), to any part or product made of metal or plastic, or combinations of metal and plastic that are not motor vehicles or mobile equipment. An area source of HAP is a source of HAP that is not a major source of HAP, is not located at a major source, and is not part of a major source of HAP emissions.

This subpart applies to sources using spray booths, ventilated prep stations, curing ovens, and associated equipment; spray guns and associated equipment, spray gun cleaning equipment

This subpart defines spray-applied coating operations as coatings that are applied using a hand-held device that creates an atomized mist of coating and deposits the coating on a

substrate. For the purposes of this subpart, spray-applied coatings do not include the following materials or activities:

1. Coatings applied from a hand-held device with a paint cup capacity that is equal to or less than 3.0 fluid ounces (89 cubic centimeters); and
2. Surface coating application using powder coating, hand-held, non-refillable aerosol containers, or non-atomizing application technology, including, but not limited to, paint brushes, rollers, hand wiping, flow coating, dip coating, electro-deposition coating, web coating, coil coating, touch-up markers, or marking pens.

The Material Safety Data Sheet for High Heat Black Enamel indicates that this coating contains compounds of chromium (Cr). The coating is used only as a touch-up paint and is applied/sprayed out of a non-refillable aerosol container. This type of application does not meet the definition of a spray applied coating. Therefore, this subpart is not applicable to Lectrus

4.5.3 ARSD 74:36:08:119 – 40 CFR Part 63, Subpart XXXXXX

The MACT standard for the control of HAPs for nine metal fabrication and finishing area source categories was finalized on July 23, 2008. An area source has the potential to emit less than 10 tons per year of a single HAP or 25 tons per year of a combination of HAPs. The provisions of this subpart are applicable to an area source that is primarily engaged in the operations in one of the following nine source categories:

1. Electrical and Electronic Equipment Finishing Operations (NAICS codes 335999 and 335312);
2. Fabricated Metal Products (NAICS codes 332117 and 332999);
3. Fabricated Plate Work (Boiler Shops) (NAICS codes 332313, 332410, and 332420);
4. Fabricated Structural Metal Manufacturing (NAICS code 332312);
5. Heating Equipment, except Electric ((NAICS code 333414);
6. Industrial Machinery and Equipment Finishing Operations (NAICS codes 333120, 333132 and 333911);
7. Iron and Steel Forging (NAICS code 33211);
8. Primary Metal products Manufacturing (NAICS code 332618); and
9. Valves and Pipe Fittings (NAICS code 332919).

The provisions of this subpart are applicable to new and existing sources primarily engaged in one of the nine operations listed above that use materials that contain or have the potential to emit metal fabrication or finishing metal HAP. Lectrus has a Standard Industrial Classification Code of 3448 and a North American Industry Classification System code of 332311. Lectrus is not one of the nine operations applicable to this subpart. Therefore, Lectrus is not applicable to this subpart

4.6 Minor Air Quality Permit

Any source operating in South Dakota that meets the requirements of the ARSD 74:36:05:03 is required to obtain a Title V air quality permit. Based on the potential uncontrolled emissions summarized in Table 4-4, Lectrus is a major source because it has the potential to emit 25 tons per year or more of a combination of hazardous air pollutants (HAPs). However, Lectrus has requested federally enforceable permit conditions to restrict the emissions of HAPs to less than 25 tons per year.

The air replacement unit is subject to the state's particulate and sulfur dioxide emission limits. Both the air replacement unit and the spray booth are required to meet the 20 percent opacity limit as required in ARSD 74:36:12:01.

4.6.1 Particulate Matter

The air replacement unit has a maximum heat input capacity of 12.15 million Btus per hour. In accordance with ARSD 74:36:06:02(b), a fuel-burning unit with heat input value greater than 10 million Btus per hour may not exceed the particulate matter emission rate determined by Equation 4-1.

Equation 4-1 – Total Suspended Particulate Matter Emission Limit

$$E = 0.811H^{-0.131}$$

Where:

- E = the allowable particulate emission rate in pounds per million Btus of heat input; and
- H = heat input in million Btus per hour.

Substituting the maximum design rate for the air replacement unit (e.g., 12.15 million Btus per hour) in Equation 4-1, the allowable emission rate is 0.6 pounds per million Btus. Multiplying the allowable particulate matter emission rate (e.g., 0.6 pounds per million Btus) by the maximum design operating rate (e.g., 12.15 million Btus per hour) will result in an allowable particulate matter emission rate of 7.3 pounds per hour. The actual particulate matter emission rate, in pounds per hour, is based on the potential emissions (e.g., 0.4 tons per year) multiplied by 2,000 pounds per ton and divided by 8,760 hours per year. The comparison of the allowable and actual particulate matter emission rates are listed in Table 4-1.

Table 4-1 – Comparison of Allowable and Actual Particulate Emissions

Unit	Allowable Emission Rate	Actual Emission Rate
#6	7.3 pounds per hour	0.1 pounds per hour

4.6.2 Sulfur dioxide

In accordance with ARSD 74:36:06:02(2), a fuel burning unit may not emit sulfur dioxide in an amount greater than three pounds of sulfur dioxide per million Btus of heat input.

Dividing the sulfur dioxide emission factor (e.g., 0.6 pounds per million cubic feet) by the maximum design operating rate (e.g., 12.15 million Btus per hour) will result in an actual sulfur dioxide emission rate of 0.001 pounds per hour. The comparison of the allowable and actual sulfur dioxide emission rates are listed in Table 4-2.

Table 4-2 – Comparison of Allowable and Actual Sulfur Dioxide Emissions

Unit	Allowable Emission Rate	Actual Emission Rate
#6	3.0 pounds per million Btus	0.001 pounds per million Btus

Based on the comparisons in Table 4-1 and 4-2, Lectrus is capable of meeting the state's particulate matter and sulfur dioxide allowable emission limits. DENR's experience with natural gas fired units indicates Lectrus will be able to meet the state's visible emission limit.

4.7 Discussion

Lectrus' existing air quality permit has four permitted sources: two small natural gas fired boilers, a distillate fired generator and a spray booth. A distillate fuel storage tank was determined to be an insignificant activity but the emissions are included in the facility's total emissions to determine the correct type of air quality permit. Table 4-4 provides the potential uncontrolled emissions from both the existing permitted sources and the proposed spray booth and air replacement unit.

Table 4-4 – Facility Potential Uncontrolled Emissions (tons/year)

Unit	TSP	PM10	PM2.5	SO₂	NO_x	CO	VOC	HAPs
#1 Boiler	0.18	0.18	0.18	0.01	2.3	1.9	0.13	0.04
#2 Boiler	0.18	0.18	0.18	0.01	2.3	1.9	0.13	0.04
#3 Generator	1.10	1.10	1.10	1.05	35.3	19.3	1.93	0.03
#4 Spray Booth	-	-	-	-	-	-	6.9	3.6
Tank	-	-	-	-	-	-	-	-
#5 Spray Booth	-	-	-	-	-	-	57.1	21.4
#6 Air Replacement	0.4	0.4	0.4	0.03	5.2	4.4	0.3	0.1
Total	2	2	2	1	45	28	67	25

The proposed modification would change the classification of Lectrus' existing permit from a minor source to a Title V air quality source (e.g., emits greater than 25 tons per year of a combination of HAPs). However, Lectrus has requested federally enforceable permit conditions that would restrict the emissions of HAPs to less than 25 tons per year. Therefore, Lectrus is still eligible for a minor air quality permit.

5.0 RECOMMENDATION

Based on the information submitted in the air quality permit application, the department recommends conditional approval of an air quality construction permit for Lectrus in Tea,

South Dakota. DENR agrees to include federally enforceable permit conditions in the minor air quality permit to allow Lectrus to avoid a Title V air quality permit.

The federally enforceable permit conditions will include a 12-month rolling total limit of 23.8 tons of hazardous air pollutants per 12-month period. Lectrus will be required to track the type of products used, the amount of HAPs in each product and use this information to calculate the amount of hazardous air pollutant emissions on a monthly basis and 12-month rolling total. In addition, Lectrus will be required to submit periodic reports verifying they are meeting the hazardous air pollutant limits.

Lectrus will be required to operate within the requirements stipulated in the following regulations under the minor air quality permit program:

1. ARSD 74:36:04 – Operating Permits for Minor Sources;
2. ARSD 74:36:11 – Performance Testing; and
3. ARSD 74:36:12 – Control of Visible Emissions.

Questions regarding this permit review should be directed to Keith Gestring, Natural Resources Project Engineer.

APPENDIX A

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